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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/798,970	03/11/2004	Yasushi Haga	9319S-000728	5341

27572 7590 06/15/2005

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EXAMINER	
HO, TU TU V	

ART UNIT	PAPER NUMBER
2818	

DATE MAILED: 06/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No.	Applicant(s)	
	10/798,970	HAGA ET AL.	
	Examiner	Art Unit	
	Tu-Tu Ho	2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) *10* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 July 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Oath/Declaration

1. The oath/declaration filed on 07/28/2004 is acceptable.

Election/ Restriction

2. Applicant's election of Invention II, claims 1-9, in the reply filed on 05/19/2005 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Specifically, Applicant did not prove that the two inventions were not distinct.

3. Claim 10 is withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 05/19/2005, as noted above.

Drawings

4. Figures 13A through 13C should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the

application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 2 and 8** are rejected under 35 U.S.C. §103(a) as being unpatentable over Nistler et al. U.S. Patent 6,096,616 (the '616 reference).

The '616 reference discloses in Fig. 10 and respective portions of the specification a semiconductor device and a method of manufacturing thereof substantially as claimed.

Referring to claims 2 and 8, the reference discloses a semiconductor device and a method of manufacturing thereof comprising:

a semiconductor region in which an impurity of one conductivity type is doped;

a gate insulation layer (no number) formed on the semiconductor region;

a gate electrode (no number) formed on the gate insulation layer;

a lightly doped layer (120, or 124, or 128), formed in a region from a principal surface of the semiconductor region to a first depth of the semiconductor region, in which a first impurity

of another conductivity type (although the reference does not explicitly disclose that the first impurity is of another conductivity type, the first impurity is of the another conductivity type for the device to function) is implanted into the semiconductor region with a first dose amount; and

a heavily doped layer, formed in a depth direction from the principal surface of the semiconductor region, in which a second impurity of the another conductivity type is implanted into the semiconductor region with a second dose amount so that a peak position of a concentration of the second impurity exists at a second depth position, the second depth position being less than the first depth (column 3, lines 12-20, column 4, lines 18-23, column 6, first paragraph, and column 8, claim 7).

However, the reference does not disclose any specific numerical doping depth for the different doping depths. Specifically, although the reference teaches that the second depth position is less than the first depth, the reference fails to disclose that the second depth position is less than the first depth by about 0.15 μm or more.

Nevertheless, because the '616 reference does not disclose any specific numerical depth, one of ordinary skill in the art at the time the invention was made would be able to select various numerical doping depths, so long as the second depth position is less than the first depth, therefore such selecting would not be patentable.

6. **Claims 1 and 7** are rejected under 35 U.S.C. §103(a) as being unpatentable over Nistler et al. U.S. Patent 6,096,616 (the '616 reference) or as being unpatentable over Nistler in view of Huster et al. U.S. Patent 6,395,606 (the '606 reference).

The '616 reference discloses in Fig. 10 and respective portions of the specification a semiconductor device and a method of manufacturing thereof substantially as claimed.

Referring to claims 1 and 7, the reference discloses a semiconductor device and a method of manufacturing thereof comprising:

a semiconductor region in which an impurity of one conductivity type is doped;

a gate insulation layer (no number) formed on the semiconductor region;

a gate electrode (no number) formed on the gate insulation layer;

a lightly doped layer (120, or 124, or 128), formed in a region from a principal surface of the semiconductor region to a first depth of the semiconductor region, in which a first impurity of another conductivity type (although the reference does not explicitly disclose that the first impurity is of another conductivity type, the first impurity is of the another conductivity type for the device to function) is implanted into the semiconductor region with a first dose amount; and

a heavily doped layer, formed in a region from the principal surface of the semiconductor region to a second depth, in which a second impurity of the another conductivity type is implanted into the semiconductor region with a second dose amount; the second dose amount being large than the first dose amount (column 3, lines 12-20, column 4, lines 18-23, column 6, first paragraph, and column 8, claim 7).

wherein the second depth is less than the first depth (column 3, lines 12-20, column 4, lines 18-23, column 6, first paragraph, and column 8, claim 7).

However, the reference fails to disclose that the second dose amount is in a range of the first dose amount or more to 1 x $10^{15}/cm^2$ or less. In other words, although the '616 reference

discloses that the second dose amount is large than the first dose amount as claimed, the reference fails to established an upper limit for the dose amount of 1 x $10^{15}/cm^2$ or less.

Nevertheless, since the '616 reference is completely silent as to the specific numerical dosage, one of ordinary skill in the art at the time the invention was made would be able to select various numerical dose amounts, so long as the second dose amount is large than the first dose amount, therefore such selecting would not be patentable.

Alternatively, Huster, in also disclosing a semiconductor device and a method of manufacturing thereof, teaches that a second dose amount (for the heavily doped layer 113) is about 1 x $10^{15}/cm^2$ (column 4, lines 40-50, "1 x 10^{15} atoms cm^{-2}"), thereby teaching a dose amount of about 1 x $10^{15}/cm^2$ for the second dose amount.

Therefore, it would have been obvious to one of ordinary skill in the art the time the invention was made to form the '616 reference's second dose amount such that it has a numerical dosage of about 1 x $10^{15}/cm^2$. One would have been motivated to make such a change because the '616 reference fails to establish a numerical dose amount for the second dose amount and because such dose amount for the second dose amount has been taught in the art.

7. **Claims 3-6 and 9** are rejected under 35 U.S.C. §103(a) as being unpatentable over Nistler et al. U.S. Patent 6,096,616 (the '616 reference) or as being unpatentable over Nistler in view of Huster et al. U.S. Patent 6,395,606 (the '606 reference).

Claims 1 and 2 comprise all limitations of 3 and claims 7 and 8 comprise all limitations of 9, therefore claims 3 and 9 are rejected similarly as detailed above for claims 1 and 7 and claims 2 and 8.

Referring to claim 4, although the '616 reference does not explicitly disclose N-type and P-type as the one conductivity type and as the another conductivity type, N-type (negative type) and P-type (positive type) as the one conductivity type and as the another conductivity type.

Referring to claim 5, although the reference fails to teach that the second impurity type is arsenic, selecting arsenic as the second impurity type was known in the art, for example the selecting arsenic as the second impurity type as disclosed by the '606 reference, therefore such selecting would have been obvious.

Referring to claim 6, the '616 reference further discloses a trench structure (no number) that isolates the semiconductor region.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tu-Tu Ho whose telephone number is (571) 272-1778. The examiner can normally be reached on 6:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DAVID NELMS can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TH

Tu-Tu Ho
June 06, 2005